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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,684	02/15/2006	Dan Andreyevitch Yanson	305832-00109	8311
64770 7590 09/25/2008 Momkus McCluskey, LLC 1001 Warrenton Road, Suite 500 Lisle, IL 60532				
EXAMINER GOLUB, MARCIA A				
ART UNIT 2828		PAPER NUMBER		
MAIL DATE 09/25/2008		DELIVERY MODE PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/524,684

**Applicant(s)**

YANSON ET AL.

**Examiner**

MARCIA A. GOLUB

**Art Unit**

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 3, 5, 6, 9, 15, 17, 19, 20, 23 and 27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 7, 8, 10-14, 16, 18, 21, 22 and 24-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments with respect to claims 1, 2 and 16 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Objections***

Claims 1 and 14 are objected to because of the following informalities: the word "colinear" should be replaced with the word "collinear". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1, 2, 4, 7, 8, 10-14, 16, 18, 21, 22 and 24-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Happ et al. ("Single-mode operation..." found in IDS hereinafter IDS1, and further in view of Zhou et al. (Processing and characterization..." found in IDS) hereinafter IDS2 and Holonyak et al (5,425,043) hereinafter '043.

Fig 1 of IDS1 discloses a monolithically integrated optical device comprising: 1,13,14. "a first optical cavity having a first optical axis and supporting first optical modes;

a second optical cavity having a second optical axis and second, different, optical modes than the first optical cavity;

the first and second optical cavities being at least partially separated from each other by photonic crystal material such that optical coupling between the first and second cavities is achieved through the photonic crystal material;

the dielectric function of the photonic crystal material exhibiting a periodic variation as a function of linear distance through the material."

IDS1 does not disclose:

"the photonic crystal material being formed in a quantum well intermixed region of the substrate in which the device is formed"

However, quantum well intermixing of the photonic bandgap crystals is well known in the art as evidenced by IDS2.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of IDS2 into the device of IDS1 by quantum well intermixing the area where the photonic crystal is formed for at least the purpose of controlling the refractive index and bandgap of the coupling area between the cavities.

IDS1 does not disclose:

"second optical axis is not collinear with the first optical axis"

However, transverse coupling of cavities is well known in the art as evidenced by '043. Fig 16 of '043 discloses an array of optical cavities of different lengths that are not collinear and are transversely coupled, also the ends of the cavities are not coplanar with each other.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of '043 into the device of IDS1 and IDS2 by arranging the cavities to be not collinear with each other and transversely coupled for at least the purpose of producing a single mode operation laser.

IDS1, IDS2 and '043 disclose:

- 2,16. "in which the first and second optical axes are parallel." (Fig 16 of '043)
- 4,18. "in which the first and second optical cavities are of different lengths." (see Fig 1)
- 7,21. "in which neither of the cavity end mirrors of the first optical cavity is co-planar with either cavity end mirror of the second optical cavity." [all the end mirrors are located on different planes]
- 8,22. "in which the first and second optical cavities are separated by the photonic crystal material along lateral edges thereof." [lateral direction is not defined by the claim]
- 10-12, 24-26. "in which the photonic crystal material exhibits periodicity along two or more axes." [photonic crystal disclosed exhibits periodicity in orthogonal and parallel directions]

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***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Contact Info***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCIA A. GOLUB whose telephone number is (571)272-8602. The examiner can normally be reached on M-Th 9:30-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Marcia A. Golub-Miller/

/Minsun Harvey/  
Supervisory Patent Examiner, Art Unit 2828